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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,071	11/28/2001	Roger Young	01-376	4799

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EXAMINER

SAGAR, KRIPA

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/997,071

Applicant(s)

YOUNG ET AL.

Examiner

Kripa Sagar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: The claim recites a line tangent to the circular edge being perpendicular to a *line* lying in the plane of the wafer. The tangent to the arc would be perpendicular a *radius* defining the arc and not to *any line* in the plane. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat. 6432620 to Arao in view of US Pat. 6114085 to Padmanabhan et al.

The instant claims recite a process for inhibiting edge peeling by eliminating photoresist and anti-reflective coating (ARC) films from the edge of a wafer.

Independent claims 1,8 recite the steps of forming an ARC layer and recessing the ARC film a first distance from the edge of the wafer; coating the photoresist over the ARC and removing the resist a second distance from the edge such that the second distance is less than the first distance measured from the edge.

The dependent claims recite the limitations on the first and second distances and the relation between the two.

Arao teaches that the step of recessing photoresist from the edge of a wafer is known in prior art (Fig.9). In the edge bead removal (EBR) process the photoresist is exposed and developed at the edges (11;57- 12; 36). The peripheral width may range from 1-10 mm depending on the size of the substrate, a target value of 3.5mm being preferred (5;5-13). This is within the ranges claimed for the resist. Arao teaches that the recessed distance is *equidistant from the edge*. Arao's substrate is not circular. However on a circular wafer the recessed periphery would be measured by a line tangent (normal) to the *radius* at its end and in the plane of the substrate as recited in instant claim 9. This is implicit in the process description wherein the substrate is circular (7;58-64). Arao teaches that the process may be carried out at diverse stages of forming a device to encapsulate the underlying layer (20;12-31).

Arao does not teach that the underlayer is an ARC. However ARCs are routinely used in lithography. This is readily verified by the teachings of Padmanabhan. It teaches the use of an ARC on a wafer and *recessing the ARC by conventional EBR* techniques. The photoresist is coated on top of the ARC and *conventionally processed* (9;20-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an ARC and recess the layer by EBR as taught by Padmanabhan and form a photoresist and remove the peripheral portion by EBR as taught by Arao because Padmanabhan teaches that the ARC layer eliminates

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reflective notching and reduces line width variations (1;59-2;5) while Arao teaches that recessing the films from the edge eliminates problems with contamination (1;41-49).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 703-605-4427. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 703-308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

A handwritten signature in black ink, appearing to read 'Mark F. Huff', with a long, sweeping horizontal line extending to the right.

MH/ks

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700